

What is Claimed is:

1. A multi-function actuator comprising:

a case having an internal space;

5 a vibrating coil installed in said case for generating vibration;

a diaphragm for generating sound with an outer end being fixed to the upper end of said case;

10 a voice coil fixedly installed in the bottom of said diaphragm for generating sound according to a sound source and having an notch filter;

a vertically magnetized magnet;

an upper plated attached to said magnet for constituting a magnetic circuit;

15 a yoke for constituting the magnetic circuit together with said magnet;

a weight for constituting a vibrator body together with said magnet, said upper plate and said yoke; and

a suspension spring for supporting said vibrator body.

20 2. The multi-function actuator according to claim 1, wherein said notch filter of said voice coil has a frequency range of 100 to 500Hz.

3. The multi-function actuator according to claim 1, wherein said notch filter of said voice coil is integrally comprised in the inside thereof.

25 4. The multi-function actuator according to claim 1, wherein

said vibrating coil is arranged on a grill in said case.

5. A multi-function actuator comprising:

a case having an internal space;

a vibrating coil installed in said case for generating
5 vibration;

a diaphragm for generating sound with an outer end being fixed
to the upper end of said case;

a voice coil fixedly installed in the bottom of said diaphragm
for generating sound according to a sound source and having a
10 high-pass filter;

a vertically magnetized magnet;

an upper plated attached to said magnet for constituting a
magnetic circuit;

a yoke for constituting the magnetic circuit together with said
15 magnet;

a weight for constituting a vibrator body together with said
magnet, said upper plate and said yoke; and

a suspension spring for supporting said vibrator body.

6. The multi-function actuator according to claim 5, wherein
20 said high-pass filter comprises an inductor and a capacitor.

7. The multi-function actuator according to claim 6, wherein
said inductor is connected in parallel and said capacitor is
connector is series.

8. The multi-function actuator according to claim 5, wherein
25 said high-pass filter interrupts frequencies of under 500Hz.

9. The multi-function actuator according to claim 5, wherein said high-pass filter comprises a resistor and a capacitor.

10. The multi-function actuator according to claim 9, wherein said high-pass filter is an RC second coupled circuit that is characterized that said resistor is connected in parallel and said capacitor is connected in series.

11. The multi-function actuator according to claim 5, wherein said high-pass filter comprises a resistor, a inductor and a capacitor.

12. The multi-function actuator according to claim 11, wherein said high-pass filter is characterized that said resistor and said inductor are respectively connected in parallel and said capacitor is connected in series.

13. The multi-function actuator according to claim 12, wherein said high-pass filter is a reverse L-type circuit that is characterized that said resistor and said inductor are respectively connected in parallel and said capacitor is connected in series.

14. The multi-function actuator according to claim 12, wherein said high-pass filter is a T-type circuit that is characterized that said resistor and said inductor are respectively connected in parallel and said capacitors are connected in series and the number of said capacitors is two.

15. The multi-function actuator according to claim 12, wherein said high-pass filter is a π -type circuit that is characterized

that said resistor and said inductors are respectively connected in parallel and said capacitor is connected in series and the number of said inductors is two.

16. The multi-function actuator according to claim 5, wherein
5 said high-pass filter of said voice coil is integrally included therein.

17. The multi-function actuator according to claim 5, wherein said vibrating coil is installed on a grill in said case.

18. The multi-function actuator according to claim 6, further
10 comprising a second inductor and a second capacitor.

19. The multi-function actuator according to claim 18, wherein ones of said inductors and said capacitors are respectively connected in series to said voice coil, and the other ones of said inductors and said capacitors are mutually connected in series
15 and connected to a positive terminal of a power source.